K. V. Krombein

# ENTOMOLOGICAL NEWS

**JULY, 1938**

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# ENTOMOLOGICAL NEWS

VOL. XLIX. JULY, 1938 No. 7

## Variant Elytral Markings of Epilachna varivestis Muls. (Coleoptera: Coccinellidae).

By B. J. LANDIS and HORATIO C. MASON, Bureau of Entomology and Plant Quarantine, U. S. Department of Agriculture.

Unlike the elytral spots in many species of predacious coccinellids, these spots in *Epilachna varivestis* Muls. are relatively constant in number and size. Each elytron normally has eight spots or dots of varying size arranged in three rows as follows: Three small sub-basal spots in a broken row, the median spot less basal than the other two; three in a transverse subparallel row just before the middle, usually larger than the sub-basal; and two near the apex (Chittenden, '20) (fig. A).

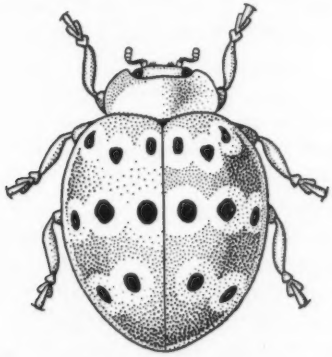


Figure A. — Adult of *Epilachna varivestis* Muls., showing normal number and size of spots.

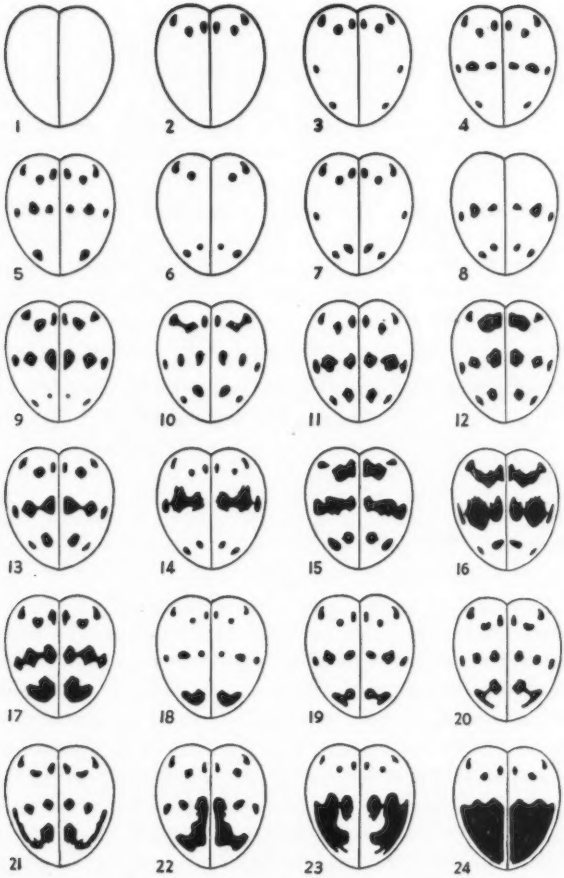
Among several thousands of beetles handled in hibernation and life-history studies in Ohio and the Federal District of Mexico, the authors occasionally found beetles with odd markings. Beetles having variant markings occurring on each

elytron were saved and the several types are here figured and discussed briefly. To clarify the discussion, each of the eight elytral spots has been given a number, beginning with the outside spot on the sub-basal row and proceeding to the elytral suture, and continuing in the same direction, from outside to inside, for the intermediate row and then the apical row of spots (Johnson, '10).

Certain differences were noted between the variant beetles from Mexico and Ohio. In the Mexican beetles there was a tendency for the normal spotting to be altered by the dropping of spots, whereas in Ohio beetles the abnormalities were caused entirely by the confluence of spots. One mature albino beetle (fig. 1) was found at Columbus, Ohio, in which the eyes, elytra, and other body parts were concolorous with the normal ground color.

In the beetles from Mexico spot 8 was lost most commonly (figs. 2 to 5), although the entire intermediate row also (spots 4, 5, and 6) was absent in two individuals (figs. 2 and 6). In one beetle spots 1, 2, and 3 (fig. 8), and in another spots 4, 5, 6, 7, and 8 (fig. 2), were lacking. The confluence of spots 7 and 8 was common (figs. 18 and 19), and in one individual spots 4, 5, 6, 7, and 8 were confluent (fig. 23). Two beetles with spotting identical with that shown in Figure 23 were found in a small field of beans near Mexico City on the same day. The confluence of spots 4, 5, and 6 (figs. 14 and 17) was not common.

In the beetles from Ohio spots 5 and 6 coalesced most commonly (fig. 13), and several individuals having this type of confluence occur in samples of 1,000 to 2,000 beetles. In one beetle spots 4, 5, and 6 coalesced (fig. 15), and this type of confluence was observed also in a beetle from Birmingham, Ala. In the Birmingham beetle spots 1, 2, and 3 also coalesced (fig. 16). Confluence of spots 2 and 3 is more common among Ohio beetles (figs. 12 and 15) than confluence of spots 1 and 2 (fig. 10). Fusion of spots 7 and 8 occurred in four beetles (figs. 20, 21, 22, and 24) but did not form an arcuate fascia as in Mexican beetles. Interesting types of confluence are illustrated




Figures 1 to 24, inclusive, showing deviation from the normal elytral spotting in adults of *Epilachna varivestis* Muls. Figures 2, 3, 4, 5, 6, 7, 8, 14, 17, 18, 19, and 23 represent beetles from the Federal District of Mexico; Figures 1, 9, 10, 11, 12, 13, 15, 20, 21, 22, and 24, from Columbus, Ohio, and Figure 16, from Birmingham, Alabama.

in Figure 21, where spots 4, 7, and 8 fuse, and in Figure 22, where spots 6, 7, and 8 coalesce. The greatest confluence of

spots was observed in three beetles found in a collection of approximately 5,000 beetles from Letart Falls, Ohio. In these beetles spots 4, 5, 6, 7, and 8 coalesced to form a large triangular fascia (fig. 24). An egg mass was obtained from one of these beetles, and of two individuals reaching the adult stage one had the same elytral spot confluence as the parent female.

LITERATURE CITED.

CHITTENDEN, F. H. 1920. The Bean Ladybird. U. S. Dept. Agr. Bull. 843, 24 p., illus.

JOHNSON, ROSWELL, H. 1910. Determinate evolution in the color-pattern of the Lady-Beetles. Pub. 122, Carnegie Inst. Wash., 104 pp., illus.

## Corrections and Additions to a recent Catalog of the Tiphiidae, (Hymenoptera).[1]

By KARL V. KROMBEIN, 22 Meadow View Place, Buffalo, New York

Since the publication of Dalla Torre's Catalogus Hymenopterorum in the last decade of the nineteenth century a large number of new species and genera have been described particularly in the groups which are of importance in the biological control of noxious insects. Consequently the appearance of a new catalog of the Hymenoptera should be most welcome to workers in this order. Inasmuch as I have just recently compiled a card catalog of the family which comprises the first part of this new Catalogus I feel it necessary to call attention to certain omissions and corrections which may serve to make the catalog more useful to systematists.

OMISSIONS.

Unquestionably the most serious fault has been in not citing the species which were originally described as species of *Tiphia* and later transferred to other genera outside the family as understood by Hedicke. Such omissions, if continued in the other parts of this new catalog, will lead to the eventual creation of a number of homonyms since the dilettante systematist,

[1] Hedicke, H. Hymenopterorum Catalogus, Pars I, Tiphiidae, 32 pp. 1936. (publ. W. Junk).

interested only in seeing his own name after a species, will merely check over the names in the Catalogus to determine whether the name he wishes to propose has been used before rather than to dig through all the early literature to compile his own catalog. To obviate the cause of such confusion it is sincerely hoped that successive parts of the Catalogus will cite these transferred species as an appendix to each genus as I have done here in the Appendix to this critique.

The following species which belong in the Tiphiidae as comprehended by Hedicke have been omitted from his catalog:

TIPHIA BREVILINEATA Allen and Jaynes. Proc. U. S. N. M., LXXVI: 70, 1930. ♀

T. FORTISTRIOLATA Cameron. Invert. Pacif., I: 170, 1907. ♂.

PARATIPHIA CANALICULATA Cameron. Biol. Centr.-Amer., Hym., II: 237, no. 6, 1893. ♀ (*Epomidiopteron*).
Dalla Torre, Cat. Hym., VIII: 143, 1897. (*Epomidiopteron*)
Cameron, Invert. Pacif., I: 105, 1905. (*Paratiphia*)

EPOMIDIOPTERON HETEROSPILUM Cameron. Timehri, Journ. Roy. Agr. & Commerc. Soc. Brit. Guiana, (3) II: 417, 1912. ♀

CORRECTIONS.

*Scoliphia* Banks should be placed as a synonym of *Epomidiopteron* de Romand[2]. *S. spilota* Banks is doubtfully distinct from *Epomidopteron julii* de Romand.

TIPHIA CANALICULATA Cameron, 1902 has priority over *T. himalayensis* Cameron, 1904 and the species should appear under the former name rather than the latter.

T. UNICOLOR Lepeletier, 1845 has priority over *T. polita* Costa, 1858 and the species should appear under the former name rather than the latter.

Inasmuch as a varietal name has no status in nomenclature it is not necessary to use *Tiphia notopolita* var. *alleni* Roberts for *T. notopolita* var. *intermedia* Allen and Jaynes.

T. DENTICULA Cameron is mis-spelled and appears in the

[2] Bridwell (Proc. Hawaii. Ent. Soc., IV: 119, 1919) is the authority for this synonymy.

catalog as *T. denticulata.*

T. MINUTOPUNCTATA Allen and Jaynes should follow *T. minuta* van der Linden.

EPOMIDIOPTERON 12-MACULATA (Cameron) is placed under *Paratiphia* as *decemmaculatus* and should be transferred to *Epomidiopteron* with the original orthography.

Some papers issued as parts of a serial publication have been cited incorrectly. For example in the reference listed under *Tiphia inornata* Say, we find the following citation—"Bradley, List Ins. N. York p. 922, 1928." To facilitate reference to this work it should have been cited as follows: Bradley [in Leonard], List Ins. New York, Cornell Univ. Agr. Expt. Sta., Memoir 101, p. 922, 1928.

In my opinion *Tiphia reticulata* Malloch is the name which should be used for the species Hedicke lists as *T. intermedia* Roberts. *T. intermedia* was proposed by Malloch as a new variety of *punctata* Robertson (preoccupied by *T. punctata* Smith) preceding by two pages *T. reticulata* which was described as a new species. Inasmuch as a varietal name has no standing in nomenclature and although *intermedia* Mall. has page priority over *reticulata* Mall., the latter should be used. Roberts, recognizing that *punctata* Robertson was preoccupied, raised *intermedia* Mall. to specific rank and proposed the variety *exitalis* for the variety *intermedia.* Allen after studying Malloch's type material concluded that *intermedia exitalis* and *reticulata* were conspecific. As I understand it the synonymy is as follows:

TIPHIA RETICULATA Malloch. Ill. Nat. Hist. Surv. Bull., XIII: 23, 1918. ♀

*Tiphia punctata* Robertson. Trans. Amer. Ent. Soc., XXVII: 196, 1901. ♂ (*nec T. punctata* Smith, 1873).

*Tiphia intermedia* Roberts. Can. Ent., LXII: 189, 1930.

VAR. INTERMEDIA Malloch. Ill. Nat. Hist. Surv. Bull., XIII: 21, 1918. ♀

*Tiphia intermedia* var. *exitalis* Roberts. Can. Ent., LXII: 189, 1930.

Two homonyms have been overlooked by Hedicke so I here-

by propose the following new names:

**Tiphia turneri**[3], *nom. nov.*, for *Tiphia pedestris* Gerstaecker, 1857 (*nec Tiphia pedestris* Fabricius, 1775).

**Tiphia palmi**[4], *nom. nov.*, for *Tiphia rufipes* F. Smith, 1855 (*nec Tiphia rufipes* Latreille, 1797).

In conclusion I might add that I am not in agreement with Hedicke's limitation of the family Tiphiidae to the six genera which he has included. Nothing is to be gained by erecting a separate family for every few genera in the Scolioid Hymenoptera and the Myzininae certainly are very closely related to the Tiphiinae proper, as are also the Brachycistinae. However, this is a point which must be settled to his own satisfaction by each worker in the field.

APPENDIX.

The following species which were omitted by Hedicke were described originally as species of *Tiphia* and were relegated later to other genera.

TIPHIA ABDOMINALIS Panzer. Fauna Ins. German., Heft 53: T. 5, 1798. To Sphecidae.

T. ANNULATA Fabricius. Ent. Syst., p. 225, no. 7, 1793. To Scoliidae.

*T. BIPUNCTATA Perty. Delect. anim. artic. Brasil., p. 139, T. 27, f. 12, 1833. To Anthoboscidae (?).

T. BREVICORNIS Panzer. Fauna Ins. German., Heft 53: T. 6, 1798. To Apoidea.

T. CAROLINIANA Panzer. Krit. Revis., II: T. 1, f. a-c, 1806. To Myzininae in Tiphiidae.

T. CENOPTERA Panzer. Fauna Ins. German., Heft 81: T. 14, 1801. To Bethylidae.

T. CILIATA Fabricius. Mant. Ins., p. 279, no. 7, 1787. To Scoliidae.

*T. CINGULATA Klug. *In* Weber & Mohr, Beitr. z. Naturk., II: 185, no. 3, 1810.

[3] For Mr. Rowland E. Turner in recognition of his studies in the aculeate Hymenoptera.

[4] For Professor Chas. E. Palm of the Cornell University Department of Entomology.

* Original not seen.

T. COLLARIS Fabricius. Syst. Ent., p. 354, no. 7, 1775. To Scoliidae.

T. CRASSICORNIS Fabricius. Mant. Ins., p. 278, no. 2, 1787. To Sphecidae.

T. DORSATA Fabricius. Mant. Ins., p. 279, no. 11, 1787. To Scoliidae.

T. EPHIPPIUM Fabricius. Syst. Ent., p. 353, no. 4, 1775. To Myzininae in Tiphiidae.

T. FLAVIPES Fabricius. Ent. Syst., p. 224, no. 3, 1793. To Sphecidae.

T. GROSSA Fabricius. Syst. Piez., p. 232, no. 4, 1805. To Scoliidae.

T. HAEMORRHOIDALIS Fabricius. Syst. Ent., p. 353, no. 3, 1775. To Sphecidae.

T. HEMIPTERA Fabricius. Supplem. Ent. Syst., p. 254, no. 1-2, 1798. To Bethylidae.

T. HISTRIONICA Fabricius. Mant. Ins., p. 279, no. 4, 1787. ?

T. INTERRUPTA Say. Narr. Exped. St. Peter's Riv., p. 322, no. 2, 1824. To Myzininae in Tiphiidae.

T. MACULATA Fabricius. Ent. Syst., p. 224, no. 4, 1793. To Myzininae in Tiphiidae.

*T. MARGINATA Klug. *In* Weber & Mohr, Beitr. z. Naturk., II: 184, no. 2, 1810. ?

T. MIXTA Fabricius. Supplem. Ent. Syst., p. 254, no. 10-11, 1798. ?

T. NIGRA Fabricius. Ent. Syst., p. 225, no. 9, 1793. To Scoliidae.

T. OBSCURA Fabricius. Syst. Piez., p. 233, no. 8, 1805. To Myzininae in Tiphiidae.

T. QUINQUECINCTA Fabricius. Syst. Ent., p. 353, no. 2, 1775. To Myzininae in Tiphiidae.

T. RADULA Fabricius. Syst. Ent., p. 354, no. 5, 1775. To Scoliidae.

T. RUFICORNIS Fabricius. Mant. Ins., p. 279, no. 12, 1787. ?

T. RUFIVENTRIS Panzer. Fauna Ins. German., Heft 53; T. 4, 1798. To Sphecidae.

T. SERENA Fabricius. Ent. Syst., p. 224, no. 4, 1793. To

Myzininae in Tiphiidae.

T. THORACICA Fabricius. Supplem. Ent. Syst., p. 254, no. 15-16, 1798. To Scoliidae.

T. TRICINCTA Fabricius. Syst. Ent., p. 354, no. 6, 1775. To Scoliidae.

T. TRIFASCIATA Fabricius. Ent. Syst., p. 226, no. 14, 1793. To Scoliidae.

T. TRIPUNCTATA Rossi. Fauna Etrusca., II: 69, no. 831, T. 6, f. 10, 1790. To Myzininae in Tiphiidae.

T. VARIEGATA Fabricius. Mant. Ins., p. 179, no. 6, 1787. To Sphecidae.

## New Species of Pacific Coast Coleoptera. (Cleridae, Pyrochroidae, Chrysomelidae).

By EDWIN C. VAN DYKE,
University of California, Berkeley, California.

FAMILY CLERIDAE.

**Bostrichoclerus,** new genus.

Large, elongate, very finely and sparsely pilose. Head large; eyes large, transverse, coarsely granular, feebly emarginate in front, and very prominent; antennae long, eleven segmented, scape robust, segments 2-5 about twice as long as broad, feebly clavate and quite glabrous, a few stiff hairs only being evident, segments 6-10 moderately serrate, eleventh fusiform, the free angles of 6-8 densley clothed with fine silky pile and the three following segments completely clothed; a prominent horn, laterally compressed and bifid at apex, arising from in front of each eye and just within the insertion of the antennae giving the latter the appearance of arising from their bases; mandibles robust; maxillary palpi four segmented, labial palpi three segmented, the terminal segments of both sets securiform, that of the labial palpi the larger, and almost an equilateral triangle. Prothorax robust, somewhat longer than broad, broadly constricted at sides in front of middle and narrowed posteriorly, basal margin a complete and well defined bead; coxal cavities rounded and narrowly opened behind. Elytra almost three times as long as prothorax, two and a half times as long as broad, rather finely, densely and irregularly punctured and without striae except for fine sutural striae close to the suture and extending from about the middle almost to the apex. Anterior

coxae conical, very narrowly separated, trochantine not visible; middle coxae feebly conical, well separated and with evident trochantine; hind coxae transverse. Abdomen with five free ventral segments. Legs long and moderately slender; tibiae with short terminal spurs; tarsal segments all well developed, flattened dorsally, 1-4 broad yet longer than broad, with the usual membranous appendages and densely papillose beneath, the fifth with sides somewhat papillose; claws simple.

*Genotype*: *Bostrichoclerus bicornus*, new species.

This rather remarkable genus belongs in the tribe Tillini and because of its coarsely granular eyes, somewhere near *Cymatodera*. It, however, does not look at all like any species of the latter genus but at first sight rather like a large species of the genus *Polycaon* of the family Bostrichidae, also because of its size and general appearance somewhat suggests *Natalis* which is structurally quite removed. Its distinctive peculiarities are the prominent frontal horns, the type of antennae and the elytra without discal striae.

**Bostrichoclerus bicornus,** new species.

Rather large, dark brown and somewhat shining. Head flattened in front, rather densely punctured above, smooth and sparsely punctured anteriorly, with a faint medial, longitudinal impression on front and sparsely pilose. Prothorax about a sixth longer than broad, base lobed at middle and sinuate each side, apex broadly arcuate and overhanging, disk irregularly punctured, more closely and deeply so in front and with short, reclinate hair arising from the punctures and a few, long erect hairs widely scattered about, and broadly and feebly impressed at middle. Scutellum semicircular, densely punctured, rugose and concave. Elytra moderately convex, with pronounced though well rounded humeri, sides almost parallel and disk somewhat dull as the result of the dense punctuation and fine rugoseness. Beneath somewhat shining, rather closely punctured anteriorly and sparsely behind. Legs with apices of tibiae beneath and undersurfaces of the tarsal segments from 1-4 densely clothed with short, silky, orange pile. Length 20 mm (with head flexed), breadth 6.5 mm.

*Holotype* (No. 4682 Mus. C. A. S. Ent.), a unique from Palm Cañon, Angel de la Guardia Is., Gulf of California, collected May 3, 1921, by J. C. Chamberlin, from beneath bark.

This insect is one of our largest clerids and like nothing else

in our fauna.

**Enoclerus inyoensis,** new species.

Small, black, with fulvous tibiae, antennae in great part and palpi rufous, and the elytra varicolored, the color pattern being as follows: the anterior half a reddish orange except for an hour-glass-shaped, sutural, black marking, broadest in front about the scutellum and a blackish line along the lateral margin in front of the median gray bar; the posterior portion densely clothed with gray pile upon a light background except for a broad, black transverse bar at the posterior third which bisects the gray patch, which may or may not be broken at the suture, and which has the pile covering it short, closely appressed and unicolorous with it. Head with front rather finely, closely punctured at sides, with a smooth, blunt ridge at center, and covered with long gray pile. Prothorax cuneate, narrowed behind, with a narrow transverse impression near base and a shallow, broader impression somewhat back of the apex, the surface finely, rather closely punctured and with gray pile at base, sides and to a slight degree in the center, elsewhere with long, black hair which extends somewhat onto the head. Elytra rather finely, closely punctured, finely rugose, and provided with scattered, erect, black setae in addition to the pubescence mentioned before. Beneath rather shining, sparsely, finely punctured and with short, scattered gray pile. Length 5-6 mm., breadth 1.75-2.25 mm.

*Holotype* (No. 4683 Mus. C. A. S. Ent.) and three *paratypes* from the Panamint Mts., Inyo Co., CALIFORNIA, collected as follows: three including type, May 29, 1937, the fourth June 18, 1937, and two by D. Little, and one each by J. W. Johnson and myself. All were beaten from pinyon pine, *Pinus monophylla* Voss.

This attractive little clerid is of about the same size as *lecontei* (*nigriventris*) (Lec.) and *humeralis* Schf., and resembles them also in having the elytra marked with a median transverse gray band and gray apex. It is less narrow and elongate than either, has a large reddish orange humeral patch, lacking in *lecontei* and much more extensive than in *humeralis,* has the gray, median bar broad and evenly arcuate, whereas it is narrow and zig-zag in *lecontei* and much vaguer in *humeralis,* and the black bar sharply defined with even margins while

it has irregular boundaries in *lecontei* and is but poorly defined in *humeralis*. In addition the tibiae are fulvous or rufus in *inyoensis* and black in the other species.

FAMILY PYROCHROIDAE.

**Ischalia (Eupleurida) californica,** new species.

Orange yellow except for the antennal segments 3-9 which are black and a large black, median elytral vitta which extends from near the base to near the apex, being about one half the width of the disk in the basal two thirds and expanded apically in the form of a transverse bar clear to the lateral margins. Head flattened in front with a small tubercle between the anterior margins of the eyes. Prothorax about one fourth broader than long, sides carinate and feebly arcuate posteriorly, more evidently rounded and convergent in front, hind angles slightly projecting posteriorly; disk bigibbous in front, with a pronounced median carina behind which extends posteriorly beyond basal border, with large transverse impressions on either side of carina and a finely pubescent surface. Scutellum tubercular. Elytra over twice as long as broad, with the sutural and lateral margins carinate as in *costata* and *vancouverensis* but with the lateral discal carinae broadly expanded throughout their course, the disk between finely, densley punctured inwardly towards suture and more coarsely and distantly punctured outwardly towards lateral carinae. Beneath unicolored orange and finely punctured and pubescent as in the other American species. Length 5-6.5 mm., breadth 2-2.5 mm.

*Holotype* (No. 4684 Mus. C. A. S. Ent.) and numerous designated *paratypes* from a large series of specimens collected near Weott, Humboldt Co., CALIFORNIA, July 13, 1929. I have also collected it near Arcata, Humboldt, Co., Calif.

This species I have been considering for some time as but a subspecies of *vancouverensis* but a more careful study has shown me that it is quite distinct. It differs from *vancouverensis* in the color pattern, in having the posterior prothoracic angles not divergent as they are in the latter, in the type of punctuation of the disk of the elytra and in the uniformly broad lateral carinae of the elytra. It has the antennal segments 3-9 a sooty black whereas they are merely fuscous or piceous in *vancouverenis;* the discal black markings of the elytra not expanded until the posterior third, then reaching

fully to the lateral margins whereas in the other the expansion is from the middle to near the apex and only reaches the lateral carinae at the sides; and the abdomen is orange in *californica* while black in *vancouverensis*. In the latter the discal elytral punctuation between the lateral carinae is uniformly coarse and somewhat reticulate while quite fine and dense towards the suture and coarser near the lateral carinae in *californica*. The lateral carinae in *californica* are uniformly wide until near their apices, in *vancouverensis* and also in *costata* they are considerably narrower as well as more depressed from about the middle.

In a recent paper Dr. Blair[1] has resurrected *Euplerida* Le Conte, for the American species chiefly on account of their being wingless and lacking a small supplementary humeral carina which is evident in all known Old World species. I prefer, however, to consider *Eupleurida* as but a subgenus of *Ischalia*, not deeming the divergent characters of sufficient importance, especially when one considers the very numerous points of resemblance, also the fact that one oriental species, the Japanese, *I. patagiata* Lewis, has the wings incompletely developed. I have always found our two Pacific Coast species about fungous growth on old decaying logs. At one time I split open a small hollow log of tanbark oak, *Lithocarpus densiflora* (H. and A.), and found the entire cavity lined with white mycelium upon which numerous larvae and adults of *californica* were feeding.

*Key for the separation of the American species of Ischalia*

1. Head black, elytra black except for median portion of lateral carinae, middle part of side margin and apices which are yellow; lateral carinae gradually narrowed from base to apex;
   Alleghany Mts. ..... *costa*
   Head orange ..... 2
2. Abdomen black and elytra with broad black median vitta extending from base of elytra to middle where suddenly dilated to lateral carinae; lateral carinae of elytra narrowed from about the middle to apex; West Br.

[1] Notes on the Colepoterous Genus *Ischalia* Pascoe, ect., by K. G. Blair, Ent. Mo. Mag., 3d Ser., Vol. VI (1920), pp. 133-135.

Col., West Wash. .....*vancouverensis*

Abdomen orange, the broad black elytral vitta extending from base to posterior third where suddenly dilated to lateral margins; lateral carinae of equal breadth from base to posterior third, then narrower; Humbolt Co., Calif. .....*californica*

FAMILY CHRYSOMELIDAE.

GLYPTOSCELIS ILLUSTRIS **aridis** new subspecies.

Somewhat similar to the typical *illustris* but differing by being proportionally shorter and broader and much more densley pilose, hence less brilliant. In typical *illustris* the proportions are: for the prothorax, length .3 to breadth .35; and for the elytra, length .75 to breadth .45; while in *aridis*, the proportions are: for the prothorax, length .27 to breadth .37; and for the elytra, length .7 to breadth .5. The anterior margin of *illustris* as seen from the side is much more oblique than in *aridis;* the white pile in *illustris* is condensed along sides of both prothorax and elytra and along elytral suture and in more or less vague, interrupted vittae on elytral disk with a larger patch at sides near the middle, while in *aridis* it is denser and more uniformly disposed; and the sparse golden brown hairs of *illustris* are scattered over the more or less denuded coppery surface of both pronotum and elytra while the light brown pile of *aridis* is most evident near the apex of the pronotum and about the humeri and posteriorly at the sides of the elytra. The impression about the scutellum also appears to be deeper in *illustris* than in *aridis.*

*Holotype* male, *allotype* female (Nos. 4685-4686, Mus. C.A.S. and five paratypes, the holotype, allotype and one paratype collected June 15, 1937, on the Westgard Pass Plateau, Inyo Mts., Inyo Co., CALIFORNIA, the first two by myself, the third which is now in the collection of B. E. White by one of my students; two other specimens collected May 27, 1937, by myself and June 7, 1937, by L. D. Phillips from the same locality and the remaining two specimens collected by Albert Koebele, in May 1891, in the Argus Mts. of Inyo Co., Calif. There are no doubt several other Argus Mt. specimens collected by Albert Koebele in the U. S. National Museum Collection. All the Inyo Mt. specimens and presumably also the Argus Mt. specimens were beaten from pinyon pine, *Pinus monophylla* Voss.

The typical *illustrus* of the Sierra Nevada Mts. is generally to be found on the ponderosa pine, *Pinus ponderosa* Lawson.

This interesting subspecies of the desert ranges of southeastern California when placed near typical specimens of *illustris* stands out very distinctly because of its greater piloseness, in fact looks very much like some of the other and more uniformly pilose species. Other species of the genus *Glyptoscelis* which, by the way, has been recently reviewed[2], that are to be found in its territory are *sequoiae* Blasid. on juniper and in Owens Valley, *alternata* Cr. on a species of wild vetch, *Glycyrrhiza lepidota* (Nutt.) and on other annuals.

## An Improved Method of Bleaching Insect Specimens

By Bryant E. Rees, Stanford University, California.

Various methods of bleaching melanic insect specimens for morphological study have been suggested, but all of them have the defect of requiring an excessive lapse of time between the beginning and end of the process. Soaking in Eau de Labarraque (hypochlorite of soda) or in Eau de Javelle (hypochlorite of potash), or boiling in hydrogen peroxide are some of the methods that have been advocated. An improved method is described by Blackwelder in his paper on the Morphology of the Coleopterous Family Staphylinidae (Smithsonian Miscellaneous Collections, Vol. 94, No. 13, 1936.) He employed the procedure of boiling the insects for a few minutes in KOH and then placing them in a 3% solution of hydrogen peroxide to which has been added a small amount of ammonia (about one drop per cc. of peroxide). By this method two to six hours are required to bleach dark sclerites and the treatment has the great advantage of leaving the edges and the sutures darker than the rest.

This method as described by Blackwelder gives excellent results, but the time involved is still excessive; and so, beginning

[2] A study of the Genus *Glyptoscelis* Le Conte in America North of Mexico, by N. L. H. Krauss, Univ. Calif. Publ. in Entom., Vol. 7, No. 2, pp. 21-39, 9 fig. (1937).

with this method, the present author has attempted to shorten the time required for its application. The method was varied in several ways and controls were obtained for the various types of specimens or parts of specimens. A beetle of the genus *Harpalus* was used as a test standard. Stronger hydrogen peroxide was employed, the 20% solution which is obtainable at drugstores being used.

Specimens or parts of specimens of light pigmentation, but yet dark enough to justify some bleaching, are boiled for 4 or 5 minutes in 10% KOH or less time if necessary to avoid the breaking down of tissues. These are then transferred directly to a vial containing about 5 cc. of 20% hydrogen peroxide to which has been added 13 to 16 drops of ammonia and allowed to stand with frequent shakings. (Do not stopper vial.) Fifteen to thirty minutes are required for bleaching. If more time is desired for less pigmented parts or for slower and better control, smaller amounts of ammonia should be used. Three to five drops of ammonia to 5 cc. of peroxide result in a slower bleaching time of one to one-and-a-half hours. The ratio of 13 to 16 drops of ammonia to 5 cc. of hydrogen peroxide is found most satisfactory and is used throughout the whole method unless otherwise specified. Also the small amount of KOH carried over with the parts of the specimens seems to better insure the bleaching.

For a more rapid bleaching of any part or for more heavily pigmented parts the method may be hastened by boiling the pieces for 5 minutes in 10% KOH, transferring the parts directly to the peroxide and ammonia solution for about one minute, and then transferring them back to *boiling* KOH. Rapid bleaching occurs in the KOH and should be closely watched. The parts or specimens are again placed in the peroxide and left from one to three minutes or until the desired degree of discoloration is reached. If necessary this may be repeated. The reaction is stopped by washing the parts in alcohol. The procedure may be completed in 10 to 15 minutes.

Even more rapid bleaching or the bleaching of very heavily

pigmented parts or specimens as *Harpalus* or *Eleodes* may be obtained by boiling them in KOH for 5 minutes and then transferring them to a casserole containing approximately 15 to 20 cc. of *clear, boiling* KOH. (Used KOH may be poured off and new added to the casserole containing the specimen and heated to boiling.) To this is added about 3 cc. of 20% hydrogen peroxide and approximately 8 drops of ammonia. This is allowed to boil. It should be closely watched as the time required is shortened to from 30 seconds to a few minutes depending on the specimens or parts of specimens. When the desired stage of bleaching is reached the reaction can be stopped by transferring to alcohol. This procedure gives very satisfactory results with whole specimens, and the speed may be controlled by the amount of peroxide added to the boiling KOH. If punctures are made in the membranes of all insects the bleaching is more uniform for specimens still containing muscles. By this procedure *Eleodes,* one of the most refractory insects that can be suggested because of the thickness of its derm and heavy pigmentation, was easily bleached to a workable condition in 15 minutes.

## Vernon Lyman Kellogg

A resolution adopted by the Division of Biology and Agriculture of the National Research Council, published in *Science* for June 3, 1938, contains the following: Vernon Lyman Kellogg was born in Emporia, Kansas, December 1, 1867. After a long and distressing illness he finally put aside the heavy burden at Hartford, Connecticut, August 8, 1937. He attended the University of Kansas where he graduated in 1889. Here he became assistant professor of entomology in 1890; he was called to Leland Stanford University in 1894 as assistant professor. He became active in the formation and administration of the National Research Council, in which he was chairman of the Division of Biology and Agriculture. Later he became secretary of the Council until ill health forced him to retire in 1932. The Division here records its heartfelt appreciation of his services in the Division and in the wider circle of the Council as a whole.

## Notes on some Dragonflies (Odonata) from Admiralty Island, Alaska.

By LEONORA K. GLOYD,

Among the recent additions to the Williamson Collection of Odonata in the Museum of Zoology of the University of Michigan, are some dragonflies from Admiralty Island, Alaska, collected by R. R. Sheppard during the summer of 1933. They are of interest largely because no specimens from this island are recorded in the literature and because three of the species, *Sympetrum danae* (Sulzer), *Somatochlora semicircularis* (Selys) and *Aeshna interrupta interrupta* Walker, have not been previously reported from Alaska.

Admiralty Island (57° to 58° 30′ latitude and 133° 50′ to 135° longitude) is about 110 miles long and 30 miles wide, and lies a little south of Juneau between the mainland and a group of seaward islands. The topography is rough with mountains rising rather abruptly from the coast to elevations of 2,000 to 4,000 feet.* According to Mr. Sheppard practically the whole island is heavily timbered, chiefly with spruce and hemlock but with some yellow cedar. It has numerous lakes two to four miles in length, many streams and beautiful meadows near the coast and in the mountain basins.

Mr. Sheppard collected insects from June 22 to August 29, but no dragonflies were taken until July 15. His field records, from which the following habitat notes are taken, show that representatives of this group were obtained from four general locations in the vicinity of Mole Harbor and Mole River:

(1) A meadow near the mouth of Mole River. "The meadows are densely green with various grasses, cinquefoil and a smaller element of skunk cabbage, deer cabbage, daisies, and many shorter plants. In some places the grass is very high, five feet or more, in other places where the cinquefoil is dominant, the herbage is six inches or less high." July 26, weather clear with hot sunshine, temperature 62°F. at 9:00 A. M.,

*A detailed account is given by Charles W. Wright in "A reconnaissance of Admiralty Island," 1906, U. S. Geol. Surv. Bull. 287, pp. 138-161, map.

66° at 3:00 P. M. August 16, rain. August 19 (on flats near shore), rain most of day except from 11-11:30 A. M. August 21, rain in morning, cloudy in afternoon.

(2) Alexander, Beaver and Hasselberg lakes. These are "wooded lakes bordered with alders, blueberries, ferns, devil's club, sphagnum, grasses, herbs, and other vegetation." Lake Alexander was visited on June 26 but no dragonflies were collected. On July 15, a clear day with bright sunshine, all three lakes were visited and the only species taken was *Enallagma cyathigerum* (Charp.). The temperature at 8:00 A. M. was 62°F.

(3) Swamps and meadows on the trail from Mole Harbor to a mountain basin south of the harbor, elevation about 1500 feet. August 25, weather clear and warm after slight fog in morning.

(4) A mountain basin with ponds of melted snow, elevation about 3000 feet. The meadows were "covered with heather, deer cabbage, grasses, sedges, lupine, asters, and other plants." August 26, weather clear and warm.

*List of Species.*

LEUCORRHINIA HUDSONICA (Selys). August 25, 2 ♂; August 26, 2 ♂ 1 ♀.

SYMPETRUM DANAE (Sulzer). August 21, 1 ♂.

SOMATOCHLORA ALBICINCTA (Burmeister). August 25, 1 ♂; August 26, 1 ♂.

SOMATOCHLORA SEMICIRCULARIS (Selys). August 25, 1 ♂.

AESHNA EREMITA Scudder. August 19, 1 ♀.

AESHNA INTERRUPTA INTERRUPTA Walker. August 19, 1 ♂.

AESHNA JUNCEA (Linné). August 21, 2 ♀; August 25, 1 ♂.

AESHNA PALMATA Hagen. July 26, 1 ♂; August 16, 7 ♂; August 19, 1 ♀; August 21, 5 ♂.

ENALLAGMA BOREALE Selys. July 26, 1 ♂; August 16, 1 ♂ 1 ♀; August 19, 1 ♂; August 25, 1 ♂. The black areas of the thorax and abdomen show a tendency to be broader and more extensive than those of specimens from more southern localities.

ENALLAGMA CYATHIGERUM (Charpentier). July 15, 8 ♂. In this series the dark areas are more extensive than usual for this species. On the thorax the mid-dorsal black stripe covers half of the mesepisternum, the humeral is almost as wide as the pale antehumeral, a black line is present on the second lateral suture, and the metinfraepisternum is outlined in black. On the abdomen the dorsal black areas are slightly enlarged on segments 1 and 2 and conspicuously increased on 3 to 7 covering approximately the apical 1/3 of segment 3, ½ of 4, 2/3 of 5, 4/5 of 6, and all of 7 except for a narrow basal ring. In addition to the more extensive color pattern, segment 1 has a lateral oblique black stripe extending across the basal angle and slightly longer than half the segment; segment 2 has a sublateral black or dark brown bar of varying extent which does not touch either the base or apex of the segment but in some specimens is narrowly joined to the apical black area; and segments 8 and 9 which are usually entirely blue have large irregular dorso-lateral patches of black. The basal area of all three pairs of coxae is also black.

LESTES DISJUNCTUS Selys. August 16, 1 ♂ 1 ♀; August 25, 1 ♂; August 26, 3 ♂ 1 ♀. These specimens are small and very dark with a noticeable metallic green lustre, quite different in appearance from the larger and paler brown and yellow *disjunctus* from the southern part of the United States.

A preliminary study of the *disjunctus* material in the Williamson Collection indicates that a gradual but definite increase in size, and decrease in the extent and intensity of coloration, takes place from north to south and from high to low altitudes. The genital characters, however, remain constant throughout the entire population. In view of this color variation and the marked similarity in abdominal appendages and genitalia between this species and the bright metallic green *Lestes sponsa* Hansem of Europe, the metallic lustre of the dark northern specimens of *disjunctus* is especially interesting. A more thorough investigation is necessary to determine the exact nature of this relationship.

# Current Entomological Literature

**COMPILED BY V. S. L. PATE, LAURA S. MACKEY and E. T. CRESSON, Jr.**

Under the above head it is intended to note papers received at the Academy of Natural Sciences, of Philadelphia, pertaining to the Entomology of the Americas (North and South), including Arachnida and Myriopoda. Articles irrelevant to American entomology will not be noted; but contributions to anatomy, physiology and embryology of insects, however, whether relating to American or exotic species will be recorded.

This list gives references of the current or last year unless otherwise noted. All continued papers, with few exceptions, are recorded only at their first installment.

For records of Economic Literature, see the Experiment Station Record, Office of Experiment Stations, Washington. Also Review of Applied Entomology, Series A, London. For records of papers on Medical Entomology, see Review of Applied Entomology, Series B.

**Note.** References to papers containing new forms or names not so stated in titles are followed by (*); if containing keys are followed by (k); papers pertaining exclusively to neotropical species, and not so indicated in the title, have the symbol (S) at the end of the title of the paper.

**The figures within brackets [ ] refer to the journal in which the paper appeared, as numbered in the list of Periodicals and Serials published in our January and June issues. This list may be secured from the publisher of Entomological News for 10c. The number of, or annual volume, and in some cases the part, heft, &c., the latter within ( ) follows; then the pagination follows the colon :**

**Papers published in the Entomological News are not listed.**

**GENERAL. — Anon.** — Association between nematodes and insects. [Nature] 141: 755. **Anon.**—Insecten in Sawarienoten. [58] 10, No. 219: 12-14. (S). **Barton, C.**—How it feels to be bitten by a black widow [spider]. [Nat. Hist., N. Y.] 48: 43-44. **Burks, Ross & Frison.**—An economical, portable light for collecting nocturnal insects. [12] 31: 316-318, ill. **Burr, M.**—The notorious case of Lady Glanville. [21] 50: 41-42. **Carpenter, Roman & Collin.**—Notes on insects collected in W. Greenland by the Oxford Univ. Greenland Expedition, 1936. [75] 1: 529-553, (*). **Cockerell, T. D. A.**—San Miguel Island, California. [Scient. Month.] 46: 180-187, ill. **Cooke, B. H.**—Nomenclature: a plea for common sense. [21] 50, Suppl.: (16). **Ewing, H. E.** The speed of insects in flight. [68] 87: 414-415. **García-Díaz, J.** — An ecological study of the fresh water insects of Puerto Rico. [J. of Agr. Univ. Puerto Rico] 22: 43-97, ill. **Marcovitch, S.**—The entomologist and human health. [Sci. Month.] 1938, June: 526-528. **Martini, E.** — Zur Frage der biologischen Arten. [110] 5: 33-43. **Martynov, A. V.**—Obituary by F. M. Carpenter. [5] 45: 80-83, ill. Obituary by T. D. A. Cockerell [68] 87: 292. **Meyrick, E.**—Obituary by T. B. Fletcher. [21] 50: 49-51, ill. **Nuttall, George H. F.**—Obituary by R. Matheson. [Journ. Parasit.] 24: 180-183, ill. Obituary by H. B. Ward. [68] 87: 337. **Urquhart, F. A.**—The insect collection of the Royal Ontario Museum of

Zoology. [4] 70: 67-70. **Wightman, A. J.**—The International Code of Zoological Nomenclature. [21] 50, Suppl.: (15)-(16). **Williams, H. B.**—Generic nomenclature. [21] 50, Suppl.: (13)-(15).

**ANATOMY, PHYSIOLOGY, ETC.—Arndt & Viets.**—Die biologischen (parasitologischen) beziehungen zwischen Arachnoideen und Spongien. [Zeit. f. Parasitenkunde] 10: 67-93. **Aubertot, M.** — Sur les membranes peritrophiques des insectes. [Arch. Zool. Exp. Gen.] 79, N. & Rev.: 49-57, ill. **Baerg, W. J.** — The poisons of scorpions and spiders, their effect and treatment. [Nat. Hist. N. Y.] 1938: 42-51, ill. **Bodenstein, D.**—Untersuchungen zum Metamorphoseproblem 1. — Kombinierte schnurings-und Transplantation- experimente an Drosophila. [87] 137: 474-505, ill. **Breakey & Olcott.**—The non-toxicity of gossypol to certain insects. [68] 87: 87. **Burns, R. K.**—Hormonal control of sex differentiation. [90] 72: 207-227, ill. **Cartwright, K. St. G.**—see under Hymenoptera. **Cochrane, F.**—An histological analysis of eye pigment development in Drosphila pseudo-obscura [Pro. R. S. Edinburgh] 57: 385-399, ill. **Corey, H. I.** — Heteropycnotic elements of Orthopterous chromosomes. [Arch. Biol. Paris] 49: 159-174, ill. **Dumitresco, M.**—Les glandes sericigenes tubulaires de Theridium tepidaraorum. [Arch. Zool. Exp. Gen.] 79, N. & Rev.: 58-68, ill. **Emerson, A. E.**—Termite nests—a study of the phylogeny of behavior. [Ecol. Monogr.] 8: 247-284, ill. **Fraenkel & Pringle.**—Halteres of flies as gyroscopic organs of equilibrium. [31] 141: 919-920, ill. **Geitler, L.** — Über den Bau des Huhekerns mit besonderer Beruchsichtigung der Heteropteren und Dipteren. [97] 58: 152-179, ill. **Goldschmidt, R.**—Intersexuality and development [90] 72: 228-242. **Gough, H. C.**—Toxicity of mercury vapour to insects. [31] 141: 922-923. **Hase, A.**—Zur hygienischen bedeutung der parasitären haus-und vogelwanzen sowie über wanzenpopulationen und wanzenkreuzugen. [Zeit. f. Parasitenkunde] 10: 1-30. **Heidermanns, H.** — Der Exkretstoffwechsel der wirbellosen Tiere. [88] 17: 263-267. **Helwig, E. R.**—The frequency of reciprocal translocations in irrediated germ cells of Circotettix verruculatus (Orth.). [Arch. Biol. Paris] 49: 143-158, ill. **Hopf, H. S.**—Investigations in the nutrition of the Ash-bark beetle, Hylesinus fraxini. [35] 25: 390-405. **Janisch, E.** — Eine neue Pilzkrankheit bei Nonnenraupen. [110] 5: 1-20, ill. **Kalo. M.**—

The diurnal activity of the strawberry weevil, Anthonomus bisignifer, with a note on the ecological meaning of the solar radiant energy. [Sci. Rep. Tohoku Imp. Univ. Japan] (4), 12: 511-530, ill. **Kettisch, J.**—Zur Kenntnis der Morphologie und Okologie der Larve von Cricotopus trifasciatus (Dipt.: Chironom.). [56] 16: 193-204, ill. **Korschelt, E.**—Cuticularsehne und Bindegewebssehne. [94] 150: 494-526, ill. (insects p. 498-503). **Krause, G.**—Einzelbeobachtungen und typische gesamtbilder der Entwicklung von Blastoderm und Keimanlage im ei der Gewachtshausschreche Tachycines asynamorus. [46] 34: 1-78, ill. **Kuhn & Piepho.**—Die Reaktionen der Hypodermis und der Versonschen Drusen auf das Verpuppenshormon bei Ephestia kühniella. [97] 58: 12-51, ill. **Larsen, O.**—Untersuchungen uber den geschlechtsapparat der Aquatilen wanzen. [Opuscula Ent.] 1, (Suppl.): 388 pp., ill. **Leach & Granovsky.**—Nitrogen in the nutrition of termites. [68] 87: 66-67. **Mast, S. O.**—Factors involved in the process of orientation in lower organisms in light. [Biol. Rev. Camb. Philosop. Soc.] 13: 186-224. (Insects p. 209-217, ill.) **Menner, E.**—Studien uber die Bewegung von Artemia salina und Branchipus stagnalis. [34] 122: 4-65, ill. **Patterson, J. T.**—Aberrant forms in Dropsophila and sex differentiation. [90] 72: 193-206, ill. **Pflugfelder, O.**—Untersuchungen über die histologischen Veränderungen und das Kernwachstum der Corpora allata von Termiten. [94] 150: 451-467, ill. **Plagge, E.**—Weitere Untersuchungen uber das Verpuppungshormon bei Schmetterlingen. [97] 58: 1-12, ill. **Pu, Chih-Lung.**—A comparative study of musculature of male genitalia in several species of Orthoptera. [Lingnan Sci. J.] 17: 21-31, ill. **Querci, O.**—Influence of reflected radiations on insects. [21] 50: 42-43. **Ribbans, C. R.**—Cytology of metamorphosis in the Culicinae. [31] 141: 920. **Schlottke, E.**—Die Hautung der Spinnenlungen und die dabei zu Beobachtende Grossenandèrung der Zellkerne. [46] 34: 207-220, ill. **Schrader, K.**—Untersuchungen uber die Normal Entwicklung des Gehirns und Gehirntransplantionen bei der Mehlmotte Ephestia kuhniella nebst einigen Bemerkungen uber das Corpora allatum. [97] 58: 52-90, ill. **Slifer, E. H.**—The formation and structure of a special water-absorbing area in the membranes covering the grasshopper egg. [53] 80: 437-457, ill. **Stossberg, M.**—Die Zellorgange bei Entwicklung der Flugellschuppen von Ephestia kuhniella. [46]

34: 173-206, ill. **Watson, G. I.**—The jump of fleas. [31] 141: 923. **Woodhill, A. R.**—Salinity tolerance and pH. range of Culex fatigans. [31] 141: 920. **Yonge, C. M.**—Recent work on the digestion of cellulose and chitin by invertebrates. [Sci. Progress] 32: 638-647. **Zirngiebl, L.**—Uber weitere Missbildungen bei Blattwespen. [56] 16: 220-223, ill.

**ARACHNIDA AND MYRIOPODA.—Arndt & Viets.**—Die biologischen (parasitologischen) Beziehungen zwichen Arachnoideen und Spongien. [Zeitschr. Parasitenk.] 10: 67-93, ill. **Baerg, W. J.**—see under Anatomy. **Fox, I.**—Notes on North American spiders of the families Gnaphosidae, Anyphaenidae, and Clubionidae. [Iowa State Coll. J .Sci.] 12: 227-243, ill. (*). **Jacot, A. P.**—New moss-mites, chiefly mid-western, Ill. [Amer. Midland Nat.] 19: 647-657, ill. **Jenks, G. E.**—The birth of a baby black widow and its enemy, a small parasitic fly. [Nat. Hist. N. Y.] 1938: 52-57, ill. **Kaston, B. J.**—Family names in the order Araneae. [Amer. Midland Nat.] 19: 638-646. **Verhoeff, K. W.**—Uber Diplopoden des Zoologische Museums in Munchen. [89] Abt. Syst., 71: 1-54, ill. (k*). **Wells, F. L.**—"Shuttling" in Argiope aurantia. [5] 45: 62-71, ill.

**THE SMALLER ORDERS OF INSECTS.—Banks, N.**—New native Neuropteroid insects. [5] 45: 72-79, ill., (k). **Calvert, P. P.**—The larval development of dragonflies of the genus Aeshna. [68] 87: 393-394. **Crawfurd-Benson, H. J.**—Bionomics of a cattle louse. [31] 141: 921. **Keler, S.**—Zur Geschichte der Mallophagenforschung. [Zeitschr. Parasitenk.] 10: 31-66, ill. **Maslers & Moorefield.**—Dragonflies. [Bull. N. H. Soc. Maryland] 8: 24-27, ill. **Mathews, G. B.**—Tardigrada from North America. [Amer. Midland Nat.] 19: 619-627, ill. **Robertson, I. C.**—Cities that grow in the dark. Museum shows termite colonies. [Hobbies, Buffalo Mus. Sci.] 18: 102-105, ill. **Ross, H. H.**—Descriptions of nearctic caddis flies. [Bull. State Nat. Hist. Surv.] 21: 101-183, ill. (*). Lectotypes of North American Caddis Flies in the Museum of Comparative Zoology. [5] 45: 1-61, ili., (*). **Spieth, H. T.**—Two interesting mayfly nymphs with a description of a n. sp. [40] no. 970, 7 pp., ill. **Traver, J. R.**—Mayflies of Puerto Rico. [J. of Agric. Univ. Puerto Rico] 22: 5-42, ill. **Wagner, J.**—Aphanipterologische Notizen. [56] 16: 252-257, ill. Eine neue art "Helmtra-

gender" Flohe aus Bolivien. [Zeitschr. Parasitenk.] 10: 132-137, ill. **Wright, M.**—Notes on the dragonflies of Reelfoot Lake, Tennessee. [J. Tenn. Acad. Sci.] 13: 104-108.

**ORTHOPTERA.—Ander, K.**—Ein abdominales Stridulationsorgan bei Cyphoderris (Prophalangopsidae) und uber die systematische Einteilung der Ensiferen (Saltatoria). [Opus. Ent., Lund] 3: 32-38, ill. Diagnosen neuer Laubheuschrecken. [Opus. Ent., Lund] 3: 50-56, (S). **Hebard, M.**—The songs of grasshoppers. [Frontiers] 2: 164-165, ill. **Isely, F. B.**—Experimental study of the survival value of Acridian protective coloration. [68] 87: 40-41.

**HEMIPTERA.—Ferris, G. F.**—Contributions to the knowledge of the Coccoidea (Hom.) VII. [Microent.] 3: 37-56, ill. **Knowlton & Allen.**—Macrosiphum Aphids infesting Artemisia. [4] 70: 73-83, ill. (k*). **Larsen, O.**—See under Anatomy. **Miller, F. W.**—Generic check list of aphids and phylloxera. [Amer. Midland Nat.] 19: 658-672. **Ossiannilssohn, F.**—Uber Zetterstedts Cicada lividella und verwandte arten der gattung Deltocephalus (Cicadina) mit beschreibungen von zwei neuen arten. [Opuscula Ent.] 3: 1-6, ill. **Spooner, C. S.**—The phylogeny of the Hemiptera based on a study of the head capsule. [Univ. Ill. Bull.] 35, No. 70: 102 pp., ill. **Stofberg, F. J.**—The citrus red scale (Aonidiella aurantii). [U. S. Afr. Dept. Agric. & For.] Sci. Bull. 167: 1-23, ill.

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MOSAICS AND OTHER ANOMALIES AMONG ANTS. By WILLIAM MORTON WHEELER. Pp. 95, 2 pls. + 18 figs. Harvard University Press, Cambridge, Mass. $2.00—The manuscript for this handsome volume was completed by Professor Wheeler just a few days before his death. In it there are revealed again the brilliant analytical mind and the exhaustive detailed knowledge of ants that were Wheeler's. The occasion for this book was the discovery by Dr. Neal Albert Weber, a student of Professor Wheeler's, of two colonies of ants containing large numbers of anomalous individuals. One of these colonies, that of a large Cryptocerine, containing 4000 gynandromorphs has not yet been studied. The other colony, that of a fungus-growing (Attine) ant, *Acromyrmex octospinosus* Reich, forms the principal subject of the present volume.

In Part I (pp 3-18), the distribution, habits and normal castes of *Acromyrmex* are carefully described and new observations are recorded on fungus gardens in artificial nests. Part II (pp 18-34), is given to a detailed description of the entire personnel of the *A. octospinosus* colony taken in Trinidad, consisting of about 8000 normal individuals including 175 females, 660 males and the rest workers of the three castes, minor media and major. In addition there were 164 anomalous individuals. Of these, 106 were females and workers, belonging to three different "mutations." There were also 10 gynandromorphs (male-female mosaics), 46 gynergates (female-worker mosaics) and 1 diploergate (major and media worker mosaic), all believed to be the progeny of one of the mutant females. In the gynandromorphs the female component is confined to a portion of the head while the body is that of a normal male, except in one specimen which had abnormal genitalia. In the other types of mosaics it is again found that one of the components is nearly always limited to a portion of the head.

Part III (pp 35-65) considers the origin of the new types of mosaics and also of those mosaics which have already appeared in the literature, including mosaics with a soldier component (dinergatandromorphs and dinergatogynes) and those having an ergatogyne and a male component (ergatogynandromorphs). As regards the determination of the sexes, it is well established for ants as for honey-bees that the males develop parthenogenetically, while the females develop from fertilized eggs. In honey-bees it is known that the female castes (worker and queen) are determined by differential feeding of the larvae (trophogenic determination). As regards the determination of the castes in ants, Emery always maintained that it was also trophogenic, while others, such as Forel, have favored the idea

that the castes are already determined in the egg and that there is a genetic difference between the castes (blastogenic determination). Wheeler states that he himself was for a long time "on the fence" in this controversy, until his studies on these mosaics won him over to the blastogenic side. The evidence he presents for this theory is based on careful comparative studies of the morphology of all the normal castes in many different groups of ants, on anomalies, including the parasitogenic ones, on the nursing and feeding behavior within ant nests and, finally, on mosaics. As to mosaics, Wheeler points out that true sex mosaics (gynandromorphs) admittedly contain two sorts of genetically different tissues making up respectively the male and the female components of the mosaic. If this is true, then caste mosaics must also be made up of two sorts of tissues which are genetically different. In a gynergate, for example, both female and worker tissues must be present. And since mosaics between the subcastes also exist (diploergates), these subcastes too must be genetically different. And so Wheeler has concluded that all the castes and sub-castes have a blastogenic origin. However, in spite of the clear and exhaustive presentation of these data on mosaics and of all other available evidence, one still feels, in the end, that additional evidence, especially evidence of an experimental nature will be necessary to really demonstrate that determination is blastogenic. (In this connection attention is called to P. W. Whiting's review and discussion of Wheeler's book in the Journal of Heredity, 29: 189-193, May, 1938, in which alternative explanations of ant mosaics are proposed). Other valuable features of Professor Wheeler's book are: the taxonomic notes on the species (Appendix A); the revision of the known non-mosaic anomalies, both the parasitogenic and the non-parasitogenic, which gives the history and synonomy of the often confusing terminology of these forms (Appendix B); and finally, the bibliography on castes and anomalies.

R. G. SCHMIEDER.

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RECENT ADVANCES IN ENTOMOLOGY by A. D. IMMS, Reader in Entomology, University of Cambridge. Second Edition. With 94 illustrations; Philadelphia P. Blakiston's Son & Co. Inc. 1937 x + 431 pp. $5.00. The first edition of this work appeared in 1931, occupied viii + 374 pages and was reviewed by Prof. Cockerell in the NEWS for July of that year. The number of chapters, their titles and most of the subdivisions in the new edition are the same as those in its predecessor. Some subjects whose inclusion might have been expected, as insect physiology, insects and climate, general morphology, insects

and plant viruses, have been omitted because they "have already formed the subjects of recent books or monographs." Much revision has been made in those chapters dealing with head segmentation, genitalia, musculature, homologies of appendages, hormones in metamorphosis, paleontology, response to visual stimuli, stimulatory organs, biological races and biological control. Prof. Cockerell's remark concerning the first edition applies, of course, to this second: "He [Dr. Imms] has chosen the most significant lines of advance, and has recorded an astonishing number of observations and discoveries, often in fields which were hardly explored until very recently." One can not read this "astonishing number" without being impressed by the fact that the conclusions reached by different investigators of the same topic, whether it be morphological physiological, paleontological or ecological, are in many cases still so divergent as to require much more study, observation and experimentation before agreement is attained. This condition of entomology—not peculiar to it—makes this book particularly valuable to all dealing with this science, and should serve as a warning to avoid dogmatism on disputed subjects.

P. P. CALVERT.

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GEO. M. LIST, Sec., Colorado State College, Fort Collins, Colorado.

# EXCHANGES

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